

REMARKS

I. Introduction

By the present amendment, claims 3, 5, 7, and 9-12 have been amended. Claims 1, 2, 4, 6, and 8 have been cancelled. Accordingly, claims 3, 5, 7, and 9-12 remain pending in the application. Claims 3, 5, and 9-12 are independent.

II. Office Action Summary

In the Office Action of September 13, 2005, the title of the invention was objected to as not being descriptive. The abstract was objected to under MPEP §608.01(b). The specification was objected to under 37 CFR §1.125(a). Claims 6 and 7 were rejected under 35 USC §112, first paragraph. Claims 1-12 were rejected under 35 USC §112, second paragraph. Claims 1-4 and 12 were rejected under 35 USC §102(b) as being anticipated by U.S. Patent No. 5,710,870 issued to Ohm et al. ("Ohm"). Claims 5-8 and 11 were rejected under 35 USC §103(a) as being unpatentable over Ohm in view of U.S. Patent No. 6,206,903 issued to Ramans. These rejections are respectfully traversed.

The Examiner's indication that claims 9 and 10 would be allowable if rewritten in independent form to include all the limitations of the base claim and any intervening claims, is noted with appreciation.

III. Objections to the Specification

The title of the invention was objected to as not being descriptive. The Office Action further required submission of a title that is clearly indicative of the invention to which the claims are directed.

Applicants have considered the suggestion made in the Office Action and changed the title to read "Medical Manipulator Having a Plurality of Joints." This title is believed to be clearly indicative of the claimed invention.

Applicants respectfully request withdrawal of this objection.

The Abstract was objected to under MPEP §608.01(b) because of various grammatical errors.

Concurrently submitted herewith is a Substitute Abstract that remedies these errors.

The specification was objected to under 37 CFR §1.125(a) because of various grammatical and idiomatic errors.

Applicants have reviewed the specification and made various corrections to address the issues raised in the Office Action.

Concurrently submitted herewith is a Substitute Specification that remedies these errors.

IV. Rejections Under 35 USC §112

Claims 6 and 7 were rejected under 35 USC §112, first paragraph as failing to comply with the enablement requirement. Regarding this rejection, the Office Action indicates that the claims contain subject matter that was not described in the specification in such a way as to enable one skilled in the art to make and/or use the invention. For example, the Office Action indicates that claim 6 recites the phrase "third guiding means" without any further details being provided in the specification.

The cancellation of claim 6 renders this particular ground of rejection moot.

The Office Action also indicates that claim 7 recites the phrase “a middle of said wire”, which is not enabling because the entire length of the wire has not been defined.

Applicants respectfully disagree. Irrespective of its length, the wire will have a middle (or midpoint). One skilled in the art would surely be able to examine the length of the wire and ascertain where the middle exists. This would amount to no more than a trivial arithmetic and geometry problem. Additionally, it is unclear why one skilled in the art would not be able to make the invention since the wire would necessarily have a single midpoint.

Applicants therefore respectfully submit that claim 7 satisfies the requirements of 35 USC §112, first paragraph.

Claims 1-12 were rejected under 35 USC §112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter regarded as the invention. Regarding this rejection, the Office Action cites various instances of language that was considered indefinite or lacking in proper antecedent basis.

By the present Amendment, Applicants have amended the claims, in part, to address the issues of indefiniteness raised in the Office Action.

It is therefore respectfully submitted that, as amended, the presently pending claims satisfy the requirements of 35 USC §112, second paragraph.

V. Rejections Under 35 USC §102

Claims 1-4 and 12 were rejected under 35 USC §102(b) as being anticipated by Ohm. Regarding this rejection, the Office Action alleges that Ohm discloses a manipulator having a plural number of joints. Each of the joints allegedly includes

two rotating members, a driving means, and means for keeping a constant distance between the rotational centers of the two rotating members. With respect to claims 2 and 3, The Office Action indicates that Ohm further discloses a guide means attached on a rotational shaft of each rotating member, a wire fixed at least at one point thereof, a second joint, and a wire for driving the joint located nearer to the tip portion to the joint on the side of the tip portion. Applicants respectfully disagree.

By the present Amendment, claim 3 has been amended to incorporate the subject matter previously recited in independent claim 1 and claim 2. As amended, independent claim 3 defines a manipulator having a plural number of joints therein. At least one of these joint comprises:

- two rotating members, disposed in opposing relation to each other;

- a driving means for driving one of said rotating members to cause a rotating movement to the other rotating member;

- said driving means including a guide means attached on a rotational shaft of each of said rotating members, and a wire having at least one end thereof fixed to said guide means; and

- a means for keeping a distance between rotational centers of said two rotating members constant,

- wherein said joint is a second or subsequent joint from a tip of the manipulator, and a wire for driving the joint locating nearer to said tip portion is guided to the joint on a side of the tip portion, passing through said guide members of said joint, and

- wherein each of the rotating members has a semicircular shape and is integrally formed with a tip of one of a base portion of the manipulator and a cylindrical portion of the manipulator.

According to independent claim 3, two rotating members are disposed in opposing relation to each other. A driving means is provided to drive one of the rotating members, thereby causing rotation of the other rotating member. The driving means includes a guide means attached on a rotational shaft of each rotating

member and a wire having at least one end fixed to the guide means. The wire drives the joint located near the tip portion and is guided to a joint on the side of the tip portion, while passing through the guide members of the joint. The joint also includes means for keeping the distance between rotational centers of the two rotating members constant. Additionally, each rotating member has a semicircular shape and is integrally formed with either the tip of the base portion of the manipulator or the cylindrical portion of the manipulator.

The Office Action alleges that Ohm discloses the features recited in the claimed invention and provides citations to various passages that allegedly disclose the features. Applicants' review of Ohm, however, has failed to reveal any disclosure for certain features recited in independent claim 3. Ohm discloses a decoupled six degree-of-freedom robot manipulator. Ohm indicates that a driving means is provided for the input passing drive component. This requires rotation of the input passing drive component in order to drive the joint. Consequently, the driving wires cannot be passed through the middle plates in order to drive the joint. See column 5, lines 44-47. In contrast, the present invention provides semicircular rotating members at the tip and root of the base portion. The rotating members themselves are connected and subsequently drive the joint portion.

Furthermore, according to Ohm, the input link and passing drive component are provided between two pivot points (38, 40) in order to support the keying drive component (46). With such an arrangement, the input link 32 must be supported at two locations. This makes it difficult to provide a compact configuration. In the claimed invention, however, the rotating members have a semicircular shape and are integrally formed with, for example, the base portion. This allows achievement of a more compact structure which is still capable of efficiently operating the

manipulator. See, for example, page 22, lines 3-9. Ohm simply fails to disclose a manipulator having two rotating members as set forth in independent claim 3.

It is therefore respectfully submitted that independent claim 3 is allowable over the art of record.

Claim 7 depends from claim 3 and is therefore believed allowable for at least the reasons set forth above with respect to independent claim 3.

As amended, independent claim 12 defines a manipulator that includes various features that are not disclosed by Ohm. For example, according to independent claim 12, a guide wire is passed through the guide means. As previously discussed with respect to independent claim 3, Ohm fails to provide such a configuration.

It is therefore respectfully submitted that independent claim 12 is allowable over the art of record.

VI. Rejections Under 35 USC §103

Claims 5-8 and 11 were rejected under 35 USC §103(a) as being unpatentable over Ohm in view of Ramans. The cancellation of claims 6 and 8 renders part of this ground of rejection moot. Regarding independent claim 5, the Office Action alleges that Ohm discloses a manipulator arm comprising most of the features recited therein. The Office Action indicates that Ohm does not specifically disclose a grip portion, but does specify that the device is capable of being used with all types of tools. Ramans is further relied upon for disclosing a surgical tool with a grip portion. Applicants respectfully disagree.

As amended, independent claim 5 defines a manipulator having a plural number of joints. At least one of the joints comprises:

two rotating members, disposed in opposing relation to each other;

a driving means for driving one of said rotating members to cause a rotating movement to the other rotating member;

a means for keeping a distance between rotational centers of said two rotating members constant;

a surgical tool portion;

a grip portion provided on said surgical tool portion;

a driver portion for driving said gripping portion provided on said surgical tool portion, and

a member for maintaining the length and phase of guiding wires used by the driver portion for driving the grip portion constant; wherein

a surgical tool connection portion is provided between said surgical tool portion and said driver portion, and said surgical tool portion can be separated from or connected to, said driver portion and said surgical tool connection portion.

Independent claim 5 recites features that are somewhat similar to those recited in independent claim 3. For example, claim 5 provides two rotating members in opposing relation to each other, and a driving means for driving one of the rotating members to cause rotation of the other rotating member. These features are simply not shown or suggested by the art of record.

It is therefore respectfully submitted that independent claim 5 is allowable over the art of record.

Independent claim 11 defines a manipulator that comprises, in part:

...

a surgical tool connection portion is provided between said surgical tool portion and said driver portion, and said surgical tool portion can be separated from or connected to, said driver portion and said surgical tool connection portion, and said surgical tool connection portion has a joint for rotating said grip portion, wherein said joint has: two (2) pieces of rotating members, being disposed opposing to each other, and each of the rotating members having a semicircular shape and being integrally formed with a tip of one of a base portion of the manipulator and a cylindrical portion of the manipulator; a driving means for driving one of said rotating members to make a rotating

movement to the other thereof; a means for keeping a distance between rotation centers of said two (2) pieces of rotating members constant; and a member for maintaining the length and phase of guiding wires used by the driver portion for driving the grip portion constant.

As previously discussed with respect to independent claim 3, Ohm fails to disclose features such as the rotating members having semicircular shape and integrally formed with a tip of either the base portion of the manipulator or the cylindrical portion of the manipulator.

It is therefore respectfully submitted that independent claim 11 is allowable over the art of record.

VII. Allowable Subject Matter

Claims 9 and 10 were indicated as being allowable, if rewritten in independent form. Applicants have therefore incorporated the subject matter of original claim 5 into these claims, as suggested in the Office Action.

Accordingly, claims 9 and 10 are now believed to be in condition for allowance.

VIII. Conclusion


For the reasons stated above, it is respectfully submitted that all of the pending claims are now in condition for allowance. Therefore, the issuance of a Notice of Allowance is believed in order, and courteously solicited.

If the Examiner believes that there are any matters which can be resolved by way of either a personal or telephone interview, the Examiner is invited to contact Applicants' undersigned attorney at the number indicated below.

AUTHORIZATION

Applicants request any shortage or excess in fees in connection with the filing of this paper, including extension of time fees, and for which no other form of payment is offered, be charged or credited to Deposit Account No. 01-2135 (Case: 520.43177X00).

Respectfully submitted,
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Attachments: **Marked-up Specification**

 Substitute Specification (Clean)

 Replacement Abstract